

**Pt. 227, App. B**

**TABLE A-2—CONVERSION FROM “PERCENT NOISE EXPOSURE” OR “DOSE” TO “8-HOUR TIME-WEIGHTED AVERAGE SOUND LEVEL” (TWA)—Continued**

Dose or percent noise exposure	TWA
840 .....	105.4
850 .....	105.4
860 .....	105.5
870 .....	105.6
880 .....	105.7
890 .....	105.8
900 .....	105.8
910 .....	105.9
920 .....	106.0
930 .....	106.1
940 .....	106.2
950 .....	106.2
960 .....	106.3
970 .....	106.4
980 .....	106.5
990 .....	106.5
999 .....	106.6

**APPENDIX B TO PART 227—METHODS FOR ESTIMATING THE ADEQUACY OF HEARING PROTECTOR ATTENUATION**

This appendix is mandatory.

Employers must select one of the following three methods by which to estimate the adequacy of hearing protector attenuation.

**I. DERATE BY TYPE**

Derate the hearing protector attenuation by type using the following requirements:

- A. Subtract 7 dB from the published Noise Reduction Rating (NRR).
- B. Reduce the resulting amount by:
  1. 20% for earmuffs,
  2. 40% for form-able earplugs, or
  3. 60% for all other earplugs.
- C. Subtract the remaining amount from the A-weighted TWA. You will have the estimated A-weighted TWA for that hearing protector.

**II. METHOD B FROM ANSI S12.6-1997 (REAFFIRMED 2002)**

Use Method B, which is found in ANSI S12.6-1997 (Reaffirmed 2002) “Methods for Measuring the Real-Ear Attenuation of Hearing Protectors.” The Director of the Federal Register approves the incorporation by reference of this standard in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of the incorporated standard from the American National Standards Institute at 1819 L Street, NW., Washington, DC 20036, or <http://www.ansi.org>. You may inspect a copy of the incorporated standard at the Federal Railroad Administration, Docket Room, 1200 New Jersey Avenue, SE., Washington, DC 20590, or at the National Archives and Records Administration (NARA). For information on the availability of this

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material at NARA, call 202-741-6030, or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

**III. OBJECTIVE MEASUREMENT**

Use actual measurements of the level of noise exposure (as an A-weighted SLOW response dose) inside the hearing protector when the employee wears the hearing protector in the actual work environment.

[71 FR 63123, Oct. 27, 2006, as amended at 74 FR 25173, May 27, 2009]

**APPENDIX C TO PART 227—AUDIOMETRIC BASELINE REVISION**

This appendix is mandatory beginning on February 26, 2009.

**I. GENERAL**

A. A professional reviewer (audiologist, otolaryngologist, or physician) shall use these procedures when revising baseline audiograms.

B. Although these procedures can be programmed by a computer to identify records for potential revision, the final decision for revision rests with a human being. Because the goal of the guidelines is to foster consistency among different professional reviewers, human override of the guidelines must be justified by specific concrete reasons.

C. These procedures do not apply to: The identification of standard threshold shifts (STS) other than an FRA STS<sup>1</sup> or to the calculation of the 25-dB average shifts that are reportable on the Form FRA F 6180.55a.

D. Initially, the baseline is the latest audiogram obtained before entry into the hearing conservation program. If no appropriate pre-entry audiogram exists, the baseline is the first audiogram obtained after entry into the hearing conservation program. Each subsequent audiogram is reviewed to detect improvement in the average (average of thresholds at 2, 3, and 4 kHz) and to detect an FRA STS. The two ears are examined separately and independently for improvement and for worsening. If one ear meets the criteria for revision of baseline, then the baseline is revised for that ear only. Therefore, if the two ears show different hearing trends, the baseline for the left ear may be from one test date, while the baseline for the right ear may be from a different test date.

E. Age corrections do not apply in considering revisions for improvement (Rule 1).

<sup>1</sup>OSHA and FRA use the same definition for Standard Threshold Shift (STS). FRA’s definition is located in §227.5. OSHA’s definition is located in 29 CFR 1910.95(g)(10)(i).

The FRA-allowed age corrections from appendix F of Part 227<sup>2</sup> may be used, if desired, before considering revision for persistent STS. Rule 2 operates in the same way, whether age corrections are used or not.

## II. RULE 1: REVISION FOR PERSISTENT IMPROVEMENT

If the average of the thresholds for 2, 3, and 4 kHz for either ear shows an improvement of 5 dB or more from the baseline value, and the improvement is present on one test and persistent on the next test, then the record should be identified for review by the audiologist, otolaryngologist, or physician for potential revision of the baseline for persistent improvement. The baseline for that ear should be revised to the test which shows the lower (more sensitive) value for the average of thresholds at 2, 3, and 4 kHz unless the audiologist, otolaryngologist, or physician determines and documents specific reasons for not revising. If the values of the three-frequency average are identical for the two tests, then the earlier test becomes the revised baseline.

## III. RULE 2: REVISION FOR PERSISTENT STANDARD THRESHOLD SHIFT

A. If the average of thresholds for 2, 3, and 4 kHz for either ear shows a worsening of 10 dB or more from the baseline value, and the STS persists on the next periodic test (or the next test given at least 6 months later), then the record should be identified for review by the audiologist, otolaryngologist, or physician for potential revision of the baseline for persistent worsening. Unless the audiologist, otolaryngologist, or physician determines and documents specific reasons for not revising, the baseline for that ear should be revised to the test which shows the lower (more sensitive) value for the average of thresholds at 2, 3, and 4 kHz. If both tests show the same numerical value for the average of 2, 3, and 4 kHz, then the audiologist, otolaryngologist, or physician should revise the baseline to the earlier of the two tests, unless the later test shows better (more sensitive) thresholds for other test frequencies.

B. Following an STS, a retest within 90 days of the periodic test may be substituted for the periodic test if the retest shows bet-

ter (more sensitive) results for the average threshold at 2, 3, and 4 kHz.

C. If the retest is used in place of the periodic test, then the periodic test is retained in the record, but it is marked in such a way that it is no longer considered in baseline revision evaluations. If a retest within 90 days of periodic test confirms an FRA STS shown on the periodic test, the baseline will not be revised at that point because the required six-month interval between tests showing STS persistence has not been met. The purpose of the six-month requirement is to prevent premature baseline revision when STS is the result of temporary medical conditions affecting hearing.

D. Although a special retest after six months could be given, if desired, to assess whether the STS is persistent, in most cases, the next annual audiogram would be used to evaluate persistence of the STS.

## APPENDIX D TO PART 227—AUDIOMETRIC TEST ROOMS

This appendix is mandatory.

A. Rooms used for audiometric testing shall not have background sound pressure levels exceeding those in Table D-1 when measured by equipment conforming at least to the Type 2 requirements of ANSI S1.4-1983 (Reaffirmed 2001) and to the Class 2 requirements of ANSI S1.11-2004, "Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters."

B. The Director of the Federal Register approves the incorporation by reference of ANSI S1.4-1983 (Reaffirmed 2001) and S1.11-2004 in this section in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of the incorporated standard from the American National Standards Institute at 1819 L Street, NW., Washington, DC 20036 or <http://www.ansi.org>. You may inspect a copy of the incorporated standard at the Federal Railroad Administration, Docket Room, 1200 New Jersey Avenue, SE., Washington, DC 20590, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

TABLE D-1—MAXIMUM ALLOWABLE OCTAVE-BAND SOUND PRESSURE LEVELS FOR AUDIOMETRIC TEST ROOMS

Octave-band center frequency (Hz)	500	1000	2000	4000	8000
Sound pressure levels—supra-aural earphones .....	40	40	47	57	62
Sound pressure levels—insert earphones .....	50	47	49	50	56

<sup>2</sup>FRA and OSHA use the same age-correction provisions. FRA's is found in appendix F

of part 227 and OSHA's in appendix F of 29 CFR 1910.95.